REMARKS

This is in response to the Office Action dated January 11, 2005. New claims 17-20 have been added. Thus, claims 1-20 are now pending. Note that claims 10-16 have been withdrawn from consideration.

The title has been amended as suggested by the Examiner. Moreover, it is respectfully submitted that the changes to claims 5 and 8 address and resolve the Section 112 issues raised by the Examiner on page 2 of the Office Action.

Claim 1 stands rejected under 35 U.S.C. Section 102(b) as being allegedly anticipated by Finnila ('072). This Section 102(b) rejection is respectfully traversed for at least the following reasons.

Claim 1 as amended requires "a field oxide film formed on a surface of the semiconductor substrate, the field oxide film having an aperture section; a pad electrode formed on the field oxide film; and a penetration electrode electrically connected to the pad electrode via the aperture section of the field oxide film and via a hole formed in the semiconductor substrate, the hole in the semiconductor substrate being formed *entirely within* the aperture section of the field oxide film, when perpendicularly viewing the semiconductor substrate, so that *an opening of the hole is smaller than the aperture section*." For example and without limitation, Fig. 1 of the instant application illustrates a field oxide film 2 formed on a surface of the semiconductor substrate 1, a pad electrode 4 formed on the field oxide film 2; and a penetration electrode 15 electrically connected to the pad electrode 4 via the aperture section of the field oxide film and via a hole formed in the semiconductor substrate 1. It can be seen in Fig. 1 that the hole in the semiconductor substrate 1 is formed entirely within the aperture section of the field oxide film 2,

so that an opening of the hole is smaller than the aperture section in the field oxide film. E.g., see pages 22-23 of the instant specification.

An example non-limiting purpose of example embodiments, relating to a penetration electrode for electrically connecting upper and lower surfaces of a substrate, is to avoid problems associated with forming a hole for the penetration electrode in the case where a pad electrode is formed on a field oxide (in a field region). These problems include difficulties in forming good insulating and conducting films due to overhanging sections of the field oxide film caused by side-etching (e.g., see pgs. 8-9 of the instant specification).

Finnila in Fig. 6 illustrates bump electrode 23, Si layer 12 (alleged semiconductor substrate), and SiO_2 layer 13 (alleged field oxide). However, the right-hand interconnect in Fig. 6 of Finnila is not formed on the alleged field oxide layer 13 as required by claim 1, and is thus unrelated to the invention of claim 1. With respect to the left-hand interconnect in Fig. 6 of Finnila, the opening of the hole in the alleged semiconductor substrate 12 is not *smaller* than the corresponding aperture section of the alleged field oxide layer 13 as called for in claim 1. Instead, on the left side of Fig. 6 of Finnila, the holes in layers 12 and 13 are of the same size which is the opposite of what claim 1 requires.

Fechner also fails to disclose or suggest the invention of claim 1. Fechner fails to disclose or suggest "the hole in the semiconductor substrate being formed *entirely within* the aperture section of the field oxide film, when perpendicularly viewing the semiconductor substrate, so that *an opening of the hole is smaller than the aperture section*" as called for in claim 1. Moreover, oxide layer 104 in Fig. 3 of Fechner cannot be considered a "semiconductor" substrate since it is merely an oxide layer. There is no hole in semiconductor substrate 102 in Fig. 3 of Fechner that is entirely within an aperture section of field oxide film 106. Furthermore,

there is no hole in semiconductor substrate 102 in Fig. 3 of Fechner that is of smaller size than an aperture section defined in field oxide 106. Fechner is entirely unrelated to the invention of claim 1.

Claim 17 requires that "the pad electrode is formed so that there is no overlap with the hole when perpendicularly viewing the semiconductor substrate." For example and without limitation, Fig. 1 of the instant application illustrates that pad electrode 4 is formed so that there is no overlap between the pad electrode 4 and the hole in the semiconductor substrate 1 when perpendicularly. The cited art fails to disclose or suggest this feature. For example, in Fig. 6 of Finnila, the electrodes 21, 23 all overlap the hole in layer 12, which is the opposite of what claim 17 requires.

Claim 18 requires "a pad electrode formed on the field oxide film; wherein: the penetration electrode is electrically connected to the pad electrode via the aperture section of the field oxide film and via a hole formed in the semiconductor substrate, the hole being formed entirely within the aperture section of the field oxide film, when perpendicularly viewing the semiconductor substrate, so that an opening of the hole is smaller than the aperture section; and the penetration electrode being formed in a field area of the surface of the semiconductor substrate." The cited art fails to disclose or suggest at least these underlined portions of claim 18.

It is respectfully requested that all rejections be withdrawn. All claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____
Joseph A. Rhoa
Reg. No. 37,515

JAR:caj
1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100